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THE ROYAL RESIDENCES OF SCOTLAND.

VI.



HOLYROOD HOUSE.

Then list, ye maidens, to my lay,
Though old the tale, and past the day;
Those wakes, now played by minstrels poor,
At midnight's darkest chilliest hour,
Those humble wakes, now scorned by all,
Were first begun in courtly hall,
When royal Mary, blithe of mood,
Kept holiday at Holyrood.

Thus does the Ettrick Shepherd invite the attention of his fair countrywomen to his poem of the *Queen's Wake*, in which the different bards of Scotland meet at Holyrood House to celebrate the return of Mary to her native land. Dr. Jamieson, in his notice of this palace, truly remarks, that nothing regarding its history has given it equal interest with its being the more general residence of that beautiful queen, who, as she had been sent to France in her infancy, to avoid the rough courtship of Henry the Eighth for his son, returned from it a widow, and almost an entire stranger to that people whom she was called to govern; who, notwithstanding her natural acuteness and many accomplishments, was ill qualified for the task,—from her French education; from her early and permanent prejudices against that religion which by far the greatest part of her subjects had embraced; from the powerful influence of the Guises, the most bigoted family in Europe; from her inheriting the hereditary weakness of her name in being a prey to designing favourites; from the barbarity of the manners of even her chief nobles, whose religion

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had not yet taught them to be "pitiful" or "courteous;" and, perhaps, above all, from her being so unfortunate as to have a rival on the throne of England, who, unable to forgive Mary for her superiority in regard to personal charms, seems, from the hour of her return to Scotland, to have determined to subject her completely to her control. To Mary, Holyrood, from being the scene of much joy, and festivity, and folly, soon became that of deep degradation and heart-rending sorrow. Here, in her very presence, under the protection of her own apartment, her nobles entered at the instigation of her husband, and, regardless of all her entreaties, ruthlessly shed the blood of her secretary. Nothing can possibly excuse such conduct on their part; but although they had found it easy to excite jealousy in the mind of the imbecile Darnley, there is reason to believe that the actors were themselves under the influence of quite a different species of jealousy,—that of the superior intellect of the more erudite Italian.

In the second floor of the present palace are Queen Mary's apartments, in one of which her bed still remains. The embroidery on the bed and chairs is said to be chiefly the work of her own hands; and this, says Dr. Jamieson, is highly probable, as, from many specimens yet remaining, which are dispersed throughout the country, it is evident that neither she nor her maids of honour were strangers to industry. "Towards the outward door of this apartment, there are," says Arnot, "in the floor large dusky spots, said to have been occasioned by Riccio's blood staining the floor, which washing

of the boards has not been able to take out." Pennant, after particularizing some good portraits in the other rooms, remarks that "the gallery of the palace, which takes up one side, is filled with colossal portraits of the kings of Scotland;" these are, however, for the most part imaginary.

Holyrood House, or Halyrude House, as it is called in Scotland, owes its origin to an abbey founded there in 1128 by David the First. It was denominated the Monastery of the Holy Rood, or Cross of the Craig, the latter term indicative of its situation in the vicinity of that rocky precipice now called Salisbury Craigs. To give greater celebrity to this religious foundation, as well as to influence the mind of David in determining him to erect an abbey here and to give it the name of the Holy Cross, a miracle is said to have been got up. The good king, it is said, being very desirous to amuse himself by hunting in the forest which surrounded the Maiden Castle (as that of Edinburgh was then called) on Rood-day, or that of the Exaltation of the Cross, after the solemn mass was ended, disregarded the earnest dissuasions of his devout confessor Alwine. Accordingly when he had passed through the field where the Canongate now lies, and had reached the bottom of the crag, all his nobles being separated from him, the fairest hart that had ever been seen by human eyes, with very large antlers, so frightened the king's horse that he could not possibly restrain him. The hart followed him so hard, "that he dang baith the king and his hors to the ground." The king having thrown both his hands between the antlers of the deer, in order to save himself from its stroke, the holy cross immediately slid into his hands. The deer, of course, instantly fled and vanished from his sight "quhare now springis the Rude well." On the following night he was admonished by a vision, "to big an abbay of Channonis Regular in the same place quhare he gat the croce."

During rude times the abbey, from the safety and accommodation which they afforded, and the sanctity of their character, became the lodgings of kings and nobles; and thus it sometimes happened that the abbey became extended into a palace, or a palatial residence was erected adjoining the abbey. The origin of the palace of Holyrood is uncertain, but it appears to have been commenced as early, at least, as the reign of James the Fourth, for his marriage with Margaret, daughter of Henry the Seventh, was celebrated in the palace of Holyrood, in August, 1503. By this marriage the Scotch prince became connected with both the White and the Red Rose of England, "an event," says Lord Hailes, "on which the fate of the two nations has turned throughout every succeeding age; to it we owe the union of the crowns, the union of the kingdoms, and the Protestant succession." Chalmers states that at the period of this marriage the palace had a chapel within it, and the chaplain was the keeper of the palace.

In the reign of Henry the Eighth the palace was burnt by the English. That monarch, in order to promote peace between the two countries, proposed the marriage of his son Edward (afterwards the sixth of that name) with the young Queen Mary. This was agreed to by the Scotch Parliament, and a treaty was entered into, but the Queen-mother, Mary of Guise, supported by Cardinal Beaton and the zealous friends of popery, determined to defeat this wise plan, and sent Mary to France. Henry was very indignant at the insult thus offered to him, and determined to avenge it in a manner such as we too often hear of in these cases, not upon the authors of the insult, but upon their unoffending subjects. The earl of Hertford was sent in 1543, with a powerful fleet, to make depredations in Scotland. The troops having been landed, marched upon Edinburgh, when a deputation from that city appeared, offering the keys of the town, on condition that the inhabitants were allowed to carry off their

property and the town saved from fire. The answer was, that unless they submitted unconditionally to the will of Henry's lieutenant, "he would put them to the sword and their town to the fire." The inhabitants having displayed some feeble resistance, the following was the sad result, expressed in the words of an English writer who was on the spot.

It was determyned by the sayde Lorde-lieutenant, vtterly to ruynate and destroye the sayde towne with fyer; which, for that the nyghte drewe faste on, we omittted thoroughly to execute on that daye; but settinge fyer in thre or iiii partes of the towne, we repayed for that night vnto our campe. And the nexte mornynge very erly we began where we lefte, and continued burnynge all that daye, and the two dayes next ensuinge contynually, so that neyther within the wawles, nor in the suburbs, was lefte anyone house vnbrnt, besydes the innumerable botyes [booties], spoyle, and pyllages, that our souldyours brought from thense, notwithstanding habundaunce whiche was consumed by fyer. Also, we brnt the abbey called Holy-Rode-house, and the pallice adioynynge to the same. In the meane tyme,—there came vnto vs iiii.m. of our lyghte horsemen from the borders by the Kynges Maiesties' ap- poyntement, who dyd suche exploytes in rydding and deaustying the cuntry, that within vii myles euery waye of Edenborrough, they lefte neyther pyle [castle], village, nor house standynge vnbrnte, nor stakes [stacks] of corne, besydes great nombres of cattayles which they brought dayley into the armye, &c.

The abbey, together with the choir and cross of its church, were destroyed in this inhuman expedition; the body of the church was all that remained standing. The brazen font belonging to it was carried off by Sir Richard Lea, who presented it to the church of St. Albans, in Hertfordshire. During the minority of Edward the Sixth, after the fatal battle of Pinkie, the English paid a visit to Holyrood. Patten, who describes this visit, says, "The church and mooch parte of the house were well couered with leade. Soon after, thei pluct [plucked] of the leade, and had down the bells, (which wear but ii) and, according to the statute did somewhat hearily disgrace the house."

After these desolations the palace was speedily repaired and greatly enlarged. The palace then consisted of five courts; viz, the west, or outermost, court, which was the largest: it was bounded on the east by the front of the palace, which occupied the same space with its present front, and also extended farther south. The three remaining sides of the outer court were bounded by walls; and at the north-west corner, was a strong gate, with Gothic pillars, arches, and towers. The next court occupied the same ground with the present central court of the royal palace, and was surrounded with buildings. On the south, were two smaller courts also surrounded in the same manner; and another court on the east, bounded on the north by the chapel-royal, on the west by a line of buildings covering the same space with the present east front of the palace; on the south, by a row of buildings which are now demolished; and on the north by a wall. A writer of the year 1550, says that "the monastery of Holyrood had adjoined to it a royal palace and most pleasant gardens, enclosed by the lake at the bottom of Arthur's Seat." In the immediate vicinity of the palace there was a lion's den.

The palace was again doomed to suffer by fire. A large portion of it was burned by Cromwell's soldiers in 1650; but at the restoration it was ordered to be repaired. The present fabric was then erected. The church was also ordered to be repaired, and set apart as a chapel-royal. The manner in which this was done, has been recorded thus. A throne was erected for the Sovereign, and twelve stalls for the Knights of the Order of the Thistle; but as mass had been celebrated in it in the reign of James the Second, the populace giving vent to their fury at the Revolution, despoiled the ornaments of the inside of the church, leaving nothing but the bare walls. They even broke into the

royal sepulchral vault; in which lay the bodies of James the Fifth; of Magdalen of France, his first queen; of the Earl of Darnley; and other of the monarchs and royal family of Scotland. James the Second, while yet only Duke of York, resided for some time at Holyrood. The palace was then privileged with a printing-press, whence a number of popish books were issued. The level strip at the bottom of the high ground behind the abbey, has received the name of the Duke's Walk, from its being a favourite promenade of James.

All that now remains of Holyrood Palace are the apartments possessed by the Duke of Hamilton, as hereditary keeper of the palace. Here the young Chevalier lodged during his residence in Edinburgh; and, a few weeks after, the Duke of Cumberland, sent in pursuit of him, occupied the very same apartment and the very same bed, which is still standing. After the defeat of the royal army at Falkirk, General Hawley quartered his troops in the gallery of the palace, and these men defaced and hewed to pieces all the representations of royalty which they found there; but the paintings have since been repaired, and are now inserted into the panels of the wainscot. These apartments also afforded an asylum to Charles the Tenth of France, then Monsieur, with a few of the emigrant nobles, between the years 1795 and 1799, when there was no safety for them in their own country. The same royal personage again found refuge for his family here, when, in 1830, he was expelled from France. In 1822, George the Fourth visited Holyrood and held his courts there, although he resided at Dalkeith, under the roof of the Duke of Buccleuch. Government has recently expended a considerable sum of money in repairing and renovating this venerable structure, and enclosing it on two sides with a magnificent iron palisade.

The precincts of the palace, including the ground which was first enclosed by James the Fifth, to the extent of about three miles, afford a sanctuary for debtors. These are, probably, the bounds of the ancient sanctuary of the monastery for the refuge and protection of criminals. This privilege is, perhaps, founded on a clause in David's charter:

I strictly forbid all persons from taking a poind [distraint], or making a seizure, in or upon the lands of the said Holy Cross, unless the Abbot refuse to do justice to the person injured.

The person who fled to the abbey was thus secure, if the Abbot chose to protect him; for no temporal judge would probably be bold enough to accuse the Abbot of injustice. Expressive of the modern indemnity, one who finds it necessary to take the benefit of the girth afforded by the environs of Holyrood House, is ludicrously styled an Abbey-laird.

The term Abbey is still popularly applied to both the chapel and the palace. Mr. Chambers describes them thus: "As they at present stand, the Palace is a handsome edifice, built in the form of a quadrangle, with a front flanked by double towers, while the abbey is reduced from its originally extensive dimensions to the mere ruin of the chapel, one corner of which adjoins to a posterior angle of the Palace. Of the palatial structure, the north-west towers alone are old." The various departments of the Palace, as well as the Chapel, are shown to strangers, for a gratuity, by the servants of the Duke of Hamilton.

In concluding these few notices of the Royal Residences of Scotland we desire to express our obligations to Dr. Jamieson's work on the Royal Palaces of that country, as also to the *Topographical Gazetteer of Scotland*, published at Glasgow during the present year; a well written work, containing abundant information on the history, topography, and statistics of most of the places of Scotland.

To describe the phenomena of the universe, to investigate their causes, and the connexion of these causes, are the principal objects of natural philosophy. To mention these objects is nearly all which is necessary to indicate its valuable effects on the mind. The habits of accurate and persevering observation, of investigation, of abstraction, and of correct reasoning, are more or less produced and cultivated by the study of this science. It furnishes abundant scope for the most sublime speculations, and calls forth the noblest exercises of the imagination, yet restrains the mind within the limits of reality. It carries us beyond the boundaries of sense, and lessens our interest in self by increasing our concern with everything around us. It enlarges the comprehension of the soul; for it offers for contemplation the laws of the universe. It prepares the student for an acquaintance with the human mind; for the strictness with which its investigations are conducted prevents that wildness of theorizing which is the bane of science; and forms the habit of cautiously attending to phenomena, in order to ascertain the general laws which regulate them. It aids the cause of religion, for it accustoms the mind to seek for the causes of observed appearances, and leads it from design and regularity to infer an intelligent First Cause.—*Encyclopædia.*

IMAGINE in your mind a great and powerful kingdom, or principality, in which all freely and with one consent conspire to direct their actions, agreeably to the will and command of one supreme king, the oldest and the best: and then suppose the bounds and limits of this empire not to be the river Halys, nor the Hellespont, nor the Mæotian lake, nor the shores of the ocean; but the heaven above, and the earth beneath. Here then let that great king sit immovable, prescribing laws to all his subjects, in which consist their safety and security. And thus you see how the order and chain of this government descend down by steps and degrees, from the Supreme God to the earth and men.—MAXIMUS TYRIUS.

OTHER religions proposed to establish the welfare of society by positive regulations and laid down a code for the government of mankind, in all the varied walks of life; but society soon outgrew its fetters, and the code of an antiquated theocracy was thrown aside, or burst asunder by the expansion of the human mind. Christianity alone aimed at a different object. Prescribing no rule for the formation of society; dictating nothing to the forms of government, it has concentrated all its energies to coerce the human heart: it is against its depravity that all its precepts are directed; to restrain its passions that all its fetters are moulded. The consequence has been, that its progress has been as steady and progressive as that of other religions has been transient and ephemeral. Mahometanism is already falling into decay, and its gigantic frame crumbling with the corrupted mass whose energies it has confined; but Christianity, walking free and unfettered in the silver robe of innocence, adapts itself equally to all ages, and sways the heart of man alike in every period of civilization. Other religions have sought, by regulating the frame of society, to direct the human mind; but Christianity, aiming only at reforming the internal spirit of the individual, has wrought, and will for ever work, the greatest and most salutary changes on society—GUIZOT.

THE system of morality which Socrates made it the business of his life to teach, was raised upon the firm basis of religion. The first principles of virtuous conduct, which are common to all mankind are, according to this excellent moralist, laws of God: and the conclusive argument by which he supports this opinion is, that no man departs from these principles with impunity. "It is frequently possible," says he, "for men to screen themselves from the penalty of human laws, but no man can be unjust, or ungrateful, without suffering for his crime: hence, I conclude, that these laws must have proceeded from a more excellent legislator than man." Socrates taught, that true felicity is not to be derived from external possessions, but from wisdom, which consists in the knowledge and practice of virtue; that the cultivation of virtuous manners is necessarily attended with pleasure as well as profit; that the honest man alone is happy; and that it is absurd to attempt to separate things, which are in nature so closely united as virtue and interest.—ENFIELD'S *History of Philosophy.*

ON DIORAMIC PAINTING.

II.

PORTABLE DIORAMAS.

THE Diorama, being usually executed on an extensive surface of canvass, and placed in a large building fitted up for the purpose, does not seem calculated to contribute to the amusements of home, nor to exercise the talents of artists and amateurs generally. Any attempt therefore to extend the knowledge of this beautiful department of the painter's art must be received with satisfaction. Such an attempt has been made by Mr. George Tait, who has liberally communicated the details of his plan for a PORTABLE DIORAMA to the public, through the medium of the Royal Society of Arts for Scotland.

It is proper to state that Mr. Tait's first attempts to present the Diorama on a small scale were made before the publication of M. Daguerre's descriptions as detailed in a former article.

It is scarcely necessary to state that the principle of the diorama, whether on a large or a small scale, remains the same. In the one case a building is constructed expressly for the exhibition of these pictures; in the other case the pictures are contained in a small box of a simple but peculiar contrivance, furnished with openings for the admission of light before and behind, (which openings are capable of being closed by moveable shades,) and having also a small opening in front, through which the sketches may be viewed. "By this simple means" (says Mr. Tait) "many pleasing and striking effects may be produced; such as passing gleams of sunshine; day melting into moonlight; day fading into darkness, followed by morning, gradually disclosing the landscape, having its former verdure shrouded in snow."

The apparatus in detail is as follows:—

1. THE BOX. Stretching-frames are to be prepared for receiving the paper or linen on which the pictures are to be executed; and as these are confined within the narrow edges of them, the frames ought to be made thick and narrow, so as not unnecessarily to increase the width of the box, and should be bevelled off to allow access to the brush in painting the back. These frames are inserted in succession through a slit in the top of the box, about two-thirds distant from the front, and are received into a groove projecting from the top, sides, and bottom of the box, of such a breadth as fully to cover the front of them.

Two openings, one above in front, and the other behind, admit the light; and both should be as large as possible. The front opening ought to be of the form seen in the figures in order to admit the light gradually; an erect right-angle triangle $H I$, with its base across the breadth of the box, being placed immediately behind the front opening to aid this object. The openings have a ply of fine tissue paper, Persian silk, or other appropriate material, placed over them to diffuse the light. This is moveable, and is usually white, but may be of orange, purple, blue, or other tint, for particular purposes; and one or two plies may be used according to circumstances. The shades for the openings may be made to open and close in any manner found convenient, but so as to exclude all light when closed.

The small opening A in the front, through which the pictures are to be viewed, ought to be opposite to the height of the ordinary horizon of pictures, perhaps about a third or a fourth part of their whole height. A small tube of about two inches in length is fixed before that opening. The outer end is to be about an inch and a quarter in length, and about an inch in height, and is to be made to fit the eye, so as to screen it from extraneous light; while its inner end must expand into an oblong opening so as to allow the spectator to view the entire picture. The tube may be made to receive lenses to magnify the pictures if desired.

The internal end of this tube must be so constructed as to prevent light from above shining into it.

The inside of the tube, and every part of the box seen through it, ought to be made as black as possible; for which purpose black velvet is very effectual. The rest of the inside, including the inner surface of the shades, ought to be white, in order to reflect light. The front of the box ought to be black outside, and surrounded by a black curtain, &c.

It is necessary to have the small opening and tube, shown in the figures at B , through which an exhibitor may view the pictures, when the spectator is unacquainted with the management of the apparatus. It should be on the same level as the spectator's tube. If the box be large, so as to admit of a distance of eight or nine inches from the spectator's tube, it may be on the front; if not, it will be necessary to have it on the side, close by the front, and the pictures may be reflected to it by a very small mirror within the box. This is shown at C , in fig. 3. There should be placed over and behind it, to screen the eye of the exhibitor from the light without, a black moveable shade, which may be conveniently made of two parts, the upright part to support the horizontal part when in use, and both, when not in use, to fold upon the box. The part of the box within this shade is to be painted black.

The front and back shades should be fitted up in such a manner as to be opened conveniently, either by a spectator or by an exhibitor.

The box may be made of any size or proportions—the larger, the more striking the effect. And it may be supported upon a stand, or in any other convenient manner.

2. THE PICTURES. The pictures may be either in water colour upon paper, stretched in the usual manner on the frames, or in oil upon linen.

In painting the front, whether in water colours or in oil, the lights are omitted, as in ordinary water colour painting, so as to admit the light from behind to pass through, and body colours are to be avoided. The back of the pictures is to be covered with a strong semi-transparent tint, in those parts where it is wished that light shall not pass freely, or it may be rendered opaque if required. When painting the back, no light is to be used, except that transmitted through the front.

Objects painted behind are, of course, not seen by the front light; and objects painted in front appear so faint when seen by transmitted light, that it is easy to paint the back in such a manner as to make them disappear when the back light only is admitted, by which means great changes may be produced.

The appearance of fog is produced by painting the objects intended to be affected by it, on a second surface immediately behind the front surface. Light is admitted behind. When the second surface is removed more or less from the other, the objects on it appear more or less involved in fog. And as it is brought into contact with the other, the fog appears to clear away.

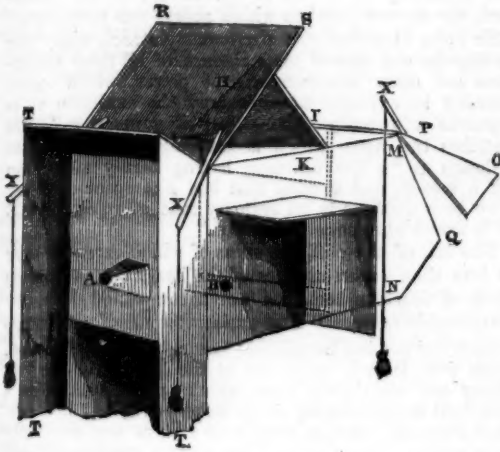
A great variety of effects of daylight and moonlight may be produced by judicious management of the pictures, and by the adoption of contrivances sufficiently known, or obvious to those who have paid any attention to art generally.

3. THE LIGHT. In daylight, the back of the box is placed close to a window, and no more light ought to be admitted into the apartment than is necessary fully to light the box. At night the openings may be lighted with oil or gas, or even with a few candles if the box be small. The very strong orange tinge of ordinary artificial light is unfavourable to the natural and pleasing effect of the pictures; but it may be so far counteracted where necessary, as sometimes in night scenes or snow views, by interposing tissue paper, or other appropriate material, tinted blue.

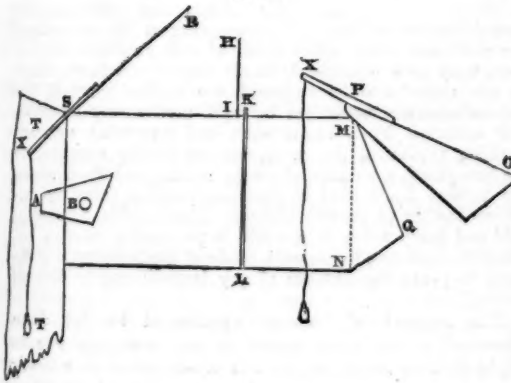
The effect produced depends in a great measure on the management of the light, and a few trials will soon enable any one to regulate its admission, so as to exhibit every change of effect.

A clearer idea of the mechanism of the box may be obtained by a summary statement of its various parts, as indicated by the letters of reference in the figures: of which No. 1 is a perspective view; No. 2, a side elevation; and No. 3, a plan of the box. The letters of reference are the same in all the figures.

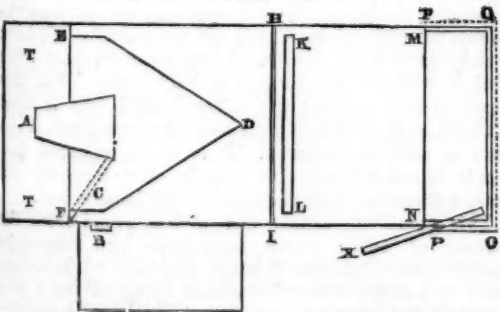
No. 1.



No. 2.



No. 3.



- A. Eye-hole for the spectator.
 B. Dito for the exhibitor, with a shade over it.
 C. Small mirror reflecting the picture to the exhibitor.
 D E F. Form of front light.
 H I. Triangle, to prevent a too sudden increase of light on raising the shade, R S.
 K L. Picture in its groove.
 M Q N. Back light. The slope N Q is closed; the slope M Q is open. It, and the front light, D E F, are covered with tissue paper, or other appropriate material. The back shade, P O extends beyond the opening. The intention of this construction is to admit the light in a proper position, and very gradually.
 T T. Curtain hung in front, so as to shade completely the light from the spectator.

THE APPLICATION OF ELECTRICITY TO THE BLASTING OF ROCKS.

PERHAPS the greatest modern improvement that has been made in blasting rocks has been by the introduction of the galvanic battery. It is well known that by closing the circuit of a voltaic current by means of thin platinum wire, or by fine iron or steel wire, the platinum becomes red-hot, and the iron or steel becomes instantly fused. All, therefore, that is necessary is to connect the two terminal wires of a voltaic battery by means of a fine wire of platinum, or iron, and to bury this in gunpowder contained in a tin canister, or a fuse connected with a deposit of gunpowder. This was the method adopted by Colonel Pasley in removing the Royal George which lay sunk at the bottom of the water at Spithead. Canisters of gunpowder, sometimes to the extent of three thousand pounds' weight, were employed, and securely deposited in the sunken vessel, by workmen who descended in the diving bell; the terminal wires of the battery, connected as above stated, were inserted in the canisters, and these wires were then extended to a great distance from the scene of the explosion, which took place the instant they were connected with the voltaic battery. After the vessel was thus blown to pieces by repeated explosions, divers descended to clear away the wreck, and to attach guns, &c., to chains let down from a ship above, and which were then hauled up by means of a crane.

Mr. Morgan, in the *American Journal of Science*, describes a fuse or cartridge which he has used with success in connection with the voltaic battery. This cartridge is prepared by joining two pieces of clean copper wire to the ends of a fine steel wire, about one quarter of an inch in length, by means of waxed silk; a thin piece of wood is then spliced to both copper wires, to protect the steel wire from accidents, and to enable the maker to introduce it easily into a quill, or small paper tube which is to form the cartridge. This tube is filled with fine gunpowder, and made air and watertight. Another piece of wood is then attached to this arrangement, and one of the copper wires is bent over so as to form an angle with the straight wire.

When it is required to use this cartridge the copper-wires are rubbed with sand-paper, and twisted round the wires of the voltaic battery. The cartridge is then placed deep in the hole made to receive the gunpowder, and the charge is fired from any distance.

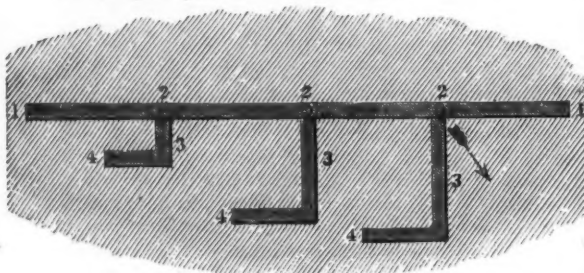
Mr. Morgan found this arrangement very useful in removing stumps of trees; but one of his applications of it was curious and novel: he exploded some powder in a pond at the depth of ten feet, with the battery at the distance of two hundred and ten feet; the explosion, which was instantaneous, had the effect of killing a large eel, and "I have no doubt," says Mr. Morgan, "that wild fowl will yet be killed by means of shells placed at low-water on the banks where they feed; and by means of long connecting wires the shells can be made to explode simultaneously among the birds."

But the grandest application of gunpowder and the voltaic battery to the blasting of rocks was made in the month of January, 1843, at Dover. It was determined by these means to attempt the removal of an enormous mass of the cliff facing the sea, which formed an obstruction to the line of railroad. A portion of the cliff which was penetrated by the tunnel made through Shakespeare's Cliff gave way, about two years previously. About fifty yards of the tunnel were carried away, and a clear space was thus formed for the line of railroad with the exception of a projecting point, which prior to the slip alluded to was the extremity of the part of the cliff pierced by the tunnel, and to remove which was the object of the operation in question.

To clear away this mass by the tedious process of manual labour, would have cost above twelve thousand pounds, and this consideration, as well as the time that

would have been lost, induced Mr. Cubitt, the engineer, to try the bold expedient of blowing it away with gunpowder. It cannot be denied, remarks Captain Stuart, whose account of this great engineering operation we follow, that there was apparent danger in the undertaking, for the weight of the mass to be removed was estimated at two million tons, and the quantity of powder used was more than eight tons, or eighteen thousand pounds. The quantity used in blowing up the fortifications of Bhurtpore was twelve thousand pounds, and this is said to have been the greatest explosion that had ever previously taken place for any single specific object.

The front of the projection was about one hundred yards wide; this front was pierced with a tunnel about six feet in height, and three in breadth; three shafts, equidistant from each other, and from the entrances to the tunnel, were sunk to the depth of seventeen feet, and galleries were run, one from each shaft, parallel with each other, and at right angles with the line of the tunnel. These galleries varied in length, the longest having been twenty-six feet, and the shortest twelve feet, and at their extremities chambers were excavated in a direction parallel with the tunnel. This description will be better understood by reference to the following figure. 1. The tunnel. 2. The shafts. 3. The galleries. 4. The chambers.



In the chambers the powder was deposited in three nearly equal quantities: it was done up in fifty pound bags, and the proportion in each chamber was contained in a wooden case, nearly as large as the chamber itself. Ignition was communicated by means of a voltaic battery; the conducting wires, one thousand feet in length, were passed over the cliff one to each chamber, and the electricity was communicated in a shed built for the purpose on the top of the cliff about fifty yards from the edge. The explosion was conducted by Lieutenant Hutchinson, R.E., who was engaged with General Pasley in blowing up the wreck of the Royal George. The time appointed for the explosion to take place, was 2 o'clock P. M., 26th January, 1843, the tide being then at its lowest ebb. The arrangements, to preserve order and prevent danger, were good. A space was kept clear by a cordon of artillery, and the following programme was issued.

"Signals, January 26, 1843.

"1st. Fifteen minutes before firing, all the signal flags will be hoisted.

"2nd. Five minutes before firing one gun will be fired, and all the flags will be hauled down.

"3rd. One minute before firing two guns will be fired, and all the flags (except that on the point which is to be blasted) will be hoisted up again."

These signals were given exactly at the specified times, and when the expected moment arrived, a deep subterranean sound was heard, a violent commotion was seen at the base of the cliff, and the whole mass slid majestically down, forming an immense *débris* at the bottom. Tremendous cheers followed the blast, and a royal salute was fired.

The remarks of different intelligent observers, as to the effects of this explosion, would of course differ according to their position with respect to the scene

of explosion. One observer states that "the earth trembled to the distance of half a mile; a stifled report, not loud but deep, was heard; the base of the cliff, extending on either hand to upwards of five hundred feet, was shot as from a cannon, from under the superincumbent mass of chalk, seaward; and in a few seconds not less than a million tons of chalk were dislodged by the shock, and settled gently down into the sea below."

But the most eminent observer who has described the effects of this explosion is Sir John Herschel, from whose letter to the *Athenæum* we gather the following particulars. His position was on the summit of the cliff, next adjoining the scene of operations, to the southward, the nearest point to which access was permitted.

Sir John Herschel was particularly struck with "the singular and almost total absence of all those tumultuous and noisy manifestations of power, which might naturally be expected to accompany the explosion of so enormous a quantity (19,000lbs.) of gunpowder." He describes the noise which accompanied the immediate explosion as "a low murmur, lasting hardly more than half a second, and so faint that had a companion at my elbow been speaking in an ordinary tone of voice, I doubt not it would have passed unheeded."

The fall of the cliff, the ruins of which extended over no less than eighteen acres of the beach, to an average depth of fourteen feet, was not accompanied with any considerable noise. "The entire absence of smoke was another and not less remarkable feature of the phenomenon. Much dust, indeed, curled out at the borders of the vast rolling and undulating mass, which spread itself like a semi-fluid body, thinning out in its progress; but this subsided instantly; and of true smoke there was absolutely not a vestige. Every part of the surface was immediately and clearly seen—the prostrate flagstaff (speedily re-erected in the place of its fall)—the broken turf which a few seconds before had been quietly growing at the summit of the cliff—and every other detail of that extensive field of ruin, were seen immediately in all their distinctness. Full in the midst of what appeared the highest part of the expanding mass, while yet in rapid motion, my attention was attracted by a tumultuous, and somewhat upward-swelling motion of the earth, whence I fully expected to see burst forth a volume of pitchy smoke, and from which my present impression is, that gas, purified from carbonaceous matter in passing through innumerable fissures of cold and damp material, was still in progress of escape; but whether so or not, the remark made at the moment is sufficient to prove the absence of any impediment to distinct vision."

The amount of tremor experienced by Sir John Herschel at the point where he was standing was so slight that he thinks he has felt it surpassed by a heavy waggon passing along a paved street. "The impression, slight, as it was, was single and brief, and must have originated with the first shock of the powder, and not from the subsequent and prolonged rush of the ruins." We have already noticed the remark of one observer, that "the earth trembled to the distance of half-a-mile;" but this seems to be a mistake; the writer fancied that it must have been so, and that he should be suspected if he were to state it otherwise. It is to be regretted that people do not endeavour to describe what they see and hear, without the embellishment of the imagination.

This grand experiment was no less grand from the absence of noise, smoke, earthquake, and fragments hurled to vast distances through the air. "I have not heard of a single scattered fragment flying out as a projectile, in any direction"—continues Sir John Herschel—"and altogether the whole phenomenon was totally unlike anything which, according to ordinary ideas, could have been supposed to arise from the action of gunpowder. Strange as it may seem, this contrast between the actual and the expected effects, gave to the whole scene a character rather of sublime composure than of headlong violence, of graceful ease than of struggling effect. How quietly, in short, the gigantic power employed performed its work may be gathered from the fact, that the operators themselves who discharged the batteries were not aware that they had taken effect, but thought the whole affair a failure, until re-assured by the shout which hailed its success."

"The remarkable absence of noise and tremor which characterized this operation is explained by the structure of chalk as a material, and by the rifted state of the cliff as a body. Of all substances, perhaps chalk is the worst adapted for conveying sound, and the best for deadening the vibration propagated through it by a heavy blow. The initial hammer-like impulse of the newly-created gas on the walls of the chambers of the mines was doubtless thus deadened by traversing at least seventy-five feet of chalk, even in the shortest direction, or line of least resistance—and this must have taken place before the mass could have been sensibly moved from its seat by the expansive force generated, which however vast, proved incapable (as indeed it was expressly provided it should be,) to communicate to its enormous load any greater velocity than barely sufficient to rift and bulge it outwards, leaving gravity to do the rest. Nothing can place in a more signal light the exactness of calculation which (basing itself on a remarkably simple rule, the result of long practical experience,) could enable the eminent engineer (Mr. Cubitt,) by whom the whole arrangements are understood to have been made, so completely to task to its utmost every pound of powder employed, as to exhaust its whole effort in useful work—leaving no superfluous power to be wasted in the production of useless uproar or mischievous dispersion, and thus saving at a blow no less than 7000*l.* to the Railway Company."

O you unwise and unlearned! teach us first what God is that you may be believed in accusing me of impiety; tell us where God is. Is he shut up within the walls of temples? is this your piety to place God in the dark, or to make him a stony god? O you unskilful! know ye not that God is not made with hands, and hath no basis or fulcrum to stand upon, nor can be inclosed within the walls of any temple; the whole world, variegated with plants, animals, and stars, being his temple?—HERACLITUS, 500 B. C.

WHEN our object is to inquire after truth, or to teach what we know to others, we should avoid poetical comparisons, because they divert the attention, and because we are apt to fancy that we understand a subject, when we are merely pleased with the beauty or aptness of the similitude.

We contemplate among all the diversified tribes of mankind, who are endowed with reason and speech, the same internal feelings, appetencies, aversions; the same inward convictions, the same sentiments of subjection to invisible powers, and, more or less fully developed, of accountability, or responsibility to unseen avengers of wrong, and agents of retributive justice, from whose tribunal man cannot even by death escape. We find everywhere the same susceptibility, though not always in the same degree of forwardness, or ripeness of improvement, of admitting the cultivation of these universal endowments, of opening the eyes of the mind to the more clear and luminous views which Christianity unfolds, of becoming moulded to the institutions of religion and civilized life: in a word, the same inward and mental nature is to be recognised in all the races of men. When we compare this fact with the observations which have been fully established as to the specific instincts and separate endowments of all the distinct tribes of sentient beings in the universe, we are entitled to draw confidently the conclusion, that all human races are of one species, and of one family.—PRICHARD.

CHESS.

ADDRESS TO THE READER.—SOLUTIONS OF PROBLEMS.

BEFORE the close of the year it may be desirable to give the solutions of the Chess problems, which, from the commencement of the present volume, have been left to the ingenuity of the young student to discover. But we first avail ourselves of this opportunity of expressing our gratification at the interest which our *Easy Lessons*, and *Chess Problems*, have excited. It confirms the opinion which we stated at some length at the opening of this series*, that where Chess is introduced as an amusement into families and schools, it

exerts a highly beneficial influence by exciting a taste for more exalted sources of recreation than are afforded by *games of chance*, which we regret to notice are still sometimes permitted to young people in the absence of other sedentary occupation for their leisure hours. Games of chance, so far from producing a beneficial influence on the mind, are apt to disturb the temper, excite animosity, and foster a spirit of gambling. Chess, on the contrary, is an effort of pure skill; it gives healthy exercise to the mental powers; it requires caution and forbearance on the part of both players; it leaves the victor satisfied with having won the game without the additional stimulus of "a stake;" and it entails no humiliation on the vanquished; it rather prompts him to greater exertions. We propose, therefore, in the ensuing volume of the *Saturday Magazine*, to continue our *Easy Lessons*, with the same motive that has hitherto guided us, namely, that of making the young student acquainted with a few of the leading features of the principal openings, that he may form some idea of the richness of the territory of Chess, a few of the paths to which is all that we pretend to point out to him, hoping that he may thus be induced to explore further for himself in the works of some of our best Chess writers.

It is also proposed to continue the selection of Chess Problems in the ensuing volume. Chess Problems form one of the most attractive departments of the game; they enable us more, perhaps, than anything else, to appreciate the subtle skill and resources of a first-rate player, and tend to elevate Chess to the rank of mathematical science, for Problems have the same relation to Chess study that Equations bear to Algebra.

We are pleased to find that our selected problems afford an agreeable source of amusement to the family circle, and many a pleasant and friendly contest, as to who shall be the first to solve them. We have received solutions from ladies as well as gentlemen; from the families of clergymen; from schools, and from many a solitary chess student.

In a great majority of these cases, the solutions have been quite accurate. There are however a few of our correspondents who require to be cautioned against hasty conclusions. They frequently tell us that such and such a problem cannot be solved in the prescribed number of moves,—that the problem is incorrectly printed,—that if a certain change were allowed the solution would be easy,—in short, they are anxious to escape from the conclusion that their efforts to solve the problem have failed. Our recommendation to such correspondents is to exercise a little more patience and ingenuity; and before they decide that we or the printer are incorrect, to confer with their chess-friends, and watch narrowly the locomotive powers of the Black King.

A few of our correspondents complain of difficulty in following out the moves in our *Easy Lessons*, in consequence of the concise method by which they are indicated. Our chess notation is that most commonly adopted in England; and it certainly has the merit of being simple, natural, and intelligible. But, in order to appreciate its advantages, it must be understood. A careful attention, for a few minutes, to the directions given in *Saturday Magazine*, Vol. XX., p. 93, will enable any one to become master of this notation; and he will then feel that all the artificial methods of numbering the squares, &c., tend to embarrass the student; while this notation greatly assists him in the knowledge of the structure of the board, and the relative positions of the pieces.

THE following solutions refer to Problems contained in the present volume: the page at which each Problem occurs will alone be stated.

* *Saturday Magazine*, Vol. XX., p. 92.

PROBLEM XV., page 8.

WHITE.

1. Kt. to K. Kt. sixth sq. chg.
2. Kt. to K. seventh sq. chg.
3. R. takes K. R. P. checking.
4. R. to K. R. square:—mate.

BLACK.

1. K. to K. Kt. square.
2. K. to K. R. square.
3. K. takes R.

If at the first move, Black take the Kt. you can then give mate in three moves: for example,

2. R. takes K. R. P. checking.
3. R. mates.
1. K. B. P. takes Kt
2. K. takes R.

PROBLEM XVI., page 52.

1. Kt. to Q. B. seventh sq. chg.
2. Kt. to Q. R. sixth sq. chg. and 2. K. to Q. R. discovering check.
3. Q. to Q. Kt. eighth sq. chg.
4. Kt. to Q. B. seventh sq. checkmate.
1. K. to Q. Kt.
2. K. to Q. R.
3. R. takes Q.

If, at the second move, Black King go to Q. B. sq., you mate at the third move with Q. at Q. B. seventh square.

It has been suggested by a correspondent that this Problem, like the well-known Problem called "Philidor's Legacy," may be solved in two moves, by playing at once Q. to Q. Kt. eighth square checking, which being taken by the Black Rook, White mates with the Knight. But suppose Black should take the Q. with his K., what then becomes of the Problem?

PROBLEM XVII., page 53.

1. Kt. takes K. B. P. checking.
2. Q. takes K. B. checking.
3. Q. B. to Q. fourth sq. chg.
4. Kt. to K. R. sixth sq. mate.
1. Q. B. takes Kt.
2. K. takes Q.
3. K. to K. Kt. square.

If, at the first move, the Black K. go to K. Kt. sq. you play the Kt. from K. Kt. fourth sq. to K. R. sixth sq. checking: he then plays

3. Kt. takes B. checkmating.
3. K. B. takes Kt.

PROBLEM XVIII., page 77.

1. Q. to K. Kt. third sq. chg.
2. Kt. to K. third sq. discovering check.
3. Q. takes K. P. checking.
4. B. to Q. Kt. sixth, checkmate.
1. K. to K. fifth square.
2. K. to Q. fifth square.
3. Kt. takes Q.

PROBLEM XIX., page 109.

1. R. takes Q. P. checking.
2. Kt. from Q. Kt. eighth to Q. B. sixth square checking.
3. Q. to K. B. eighth sq. chg.
4. Kt. mates.
1. Kt. takes R.
2. K. to K. square.
3. Kt. takes Q.

If, at the first move, Black play his King, you mate him immediately with your Q.

PROBLEM XX., page 109.

1. Q. to Q. B. sixth sq. chg.
2. B. to Q. R. fifth sq. chg.
3. Q. B. P. one square.
4. Q. Kt. P. mates
1. K. to Q. Kt. fifth square
2. K. takes B.
3. Black plays.

PROBLEM XXI., page 152.

1. Kt. takes K. P. checking.
2. R. to Q. B. fifth sq. checking.
3. K. B. to K. fourth sq. chg.
4. Q. P. advances, checkmate.
1. K. B. takes Kt
2. K. B. takes R.
3. Kt. takes K. B.

PROBLEM XXII., page 224.

1. Q. to Q. sixth square.
2. K. Kt. P. two squares.
3. Q. B. P. one square.
4. Q. to Q. fourth square, mate.
1. K. to K. fifth square.
2. K. to K. sixth square.
3. K. to K. fifth square.

SOLUTIONS TO CURIOUS CHESS PROBLEMS.

No. I., page 92.

WHITE.

1. Q. to K. Kt. second square.
2. Kt. to Q. Kt. seventh sq. mate.

BLACK.

1. R. takes Q.

The ingenuity and difficulty of this solution are well illustrated by your first move. Its object is to prevent the Black Rook from checking your K., and also to open the square from which your Kt. gives the mate. Black has the choice of several moves: should he take

your Kt. with his Kt., or your B. with his B., you checkmate with Q. at Q. second square: if he do not take the Q., but play R. to Q. seventh, you then mate with Kt. at Q. Kt. seventh as before.

No. II., page 192.

1. Q. takes P. at K. fourth sq. checking.
2. Kt. from K. B. seventh sq. to Q. sixth square checking.
3. Q. B. P. two squares.
4. P. to K. eighth sq. becoming a Knight chg. and checkmating.
1. K. takes Q
2. K. takes Kt. at Q. fourth square.
3. K. takes Kt. at Q. third square.

The chief difficulty of this problem arises from the usual construction of the law whereby every pawn which has reached the eighth, or last, square of the Chess-board becomes promoted. The Queen being the most valuable of all the pieces, she is, of course, most generally chosen in exchange for the pawn. Indeed, this is so universally the case that it becomes engrafted, as it were, into the very language of Chess: "The Pawn moves to Queen;"—"Pawn Queens;"—"Pawn to K. B. eighth square becoming a Queen;" &c., are terms generally recognised among the technicalities of Chess, and have served to diffuse the notion that a Pawn arrived at its eighth square *must* become a Queen, provided no Queen of the same colour is on the board. But the laws of Chess recognise no such notion, and no such proviso. The Twenty-first law of the London Chess Club speaks the following unambiguous language.

Every pawn which has reached the eighth, or last, square of the Chess-board, must be immediately exchanged for a Queen, or any other piece the player may think fit, even though all the pieces remain on the board. It follows, therefore, that he may have two or more Queens, three or more Rooks, Bishops, or Knights*.

Cases do occasionally arise when the fate of a game depends on the privilege of exchanging a pawn at its eighth square for some other piece than a Queen; but as the Queen has the powers of all the other pieces except the Knight, it is, of course, unnecessary to choose a Bishop, or a Rook, (unless the player give the odds of the Queen; or undertake to mate without a Queen, &c.,) but it may be desirable to choose a Knight, on account of his peculiar checking power, and in the case before us, this very singular and beautiful problem could not be solved in four moves, but for the promotion of the pawn into a Knight instead of a Queen.

No. III., page 196

1. Kt. takes P. at K. Kt. fourth square checking.
2. Kt. takes P. at K. R. third square checking.
3. Q. to K. Kt. second sq. chg.
1. B. takes Kt.
2. B. takes Kt.
3. B. takes Q. checkmating.

If, at the second move, you play Q. to K. Kt. second square checking, the Black P. must take the Q. giving checkmate.

No. IV., page 229.

WHITE.

1. R. to Q. B. seventh sq. chg.
2. R. to K. R. seventh sq. chg.
3. Kt. to K. Kt. eighth sq. chg.
4. K. R. P. two sq. checkmate.

BLACK.

1. K. to K. R. third square.
2. R. takes R.
3. K. to K. Kt. fourth square.

BLACK.

1. R. to K. R. sixth sq. chg.
2. Q. to K. Kt. seventh sq. chg.
3. Q. takes K. R. P. checking.
4. Q. to K. R. third sq. checkmate.

WHITE.

1. K. takes R.
2. K. to K. R. fourth square.
3. K. to K. Kt. fifth square.

No. V., page 240.

WHITE.

1. Kt. to K. Kt. sixth sq. chg.
2. Q. to K. sixth sq.
3. K. Kt. P., or the Q. checkmates.

BLACK.

1. Kt. takes Kt.
2. Black moves.

* The laws of the game are given in full in *Saturday Magazine*, Vol. XX., p. 247.